Invasive Species Early Detection Protocol for Klamath Network Parks

Standard Operating Procedure (SOP) #9: Databases

Version 1.00 (February 2010)

Revision History Log:

Previous Version	Revision Date	Author	Changes Made	Reason for Change	New Version

This SOP describes how to set up and use the desktop databases (project and master database) that will be used to store and maintain raw data and to develop summary reporting information. The Network Data Manager will maintain a master database that stores all the raw data for this protocol. Each year, field crews will be given a project database where they will store the data they collect while in the field. Data are collected using Trimble Pocket PCs and then uploaded to the Access project database using automated features.

Introduction

Development of a national, standardized invasive plant database is essential to the effective collection, dissemination, and consistent interpretation of invasive plant data. This is particularly true for early detection and rapid response efforts, which rely on predictable and transparent communication tools to engage an appropriate management response. At this time, an NPS national invasive plant database is still in the planning stages while the NPS Natural Resource Program Center (NRPC) transitions data systems to a Service-oriented Architecture and XML (web-based) services development approach for data management and delivery. Therefore, the Network began to research the availability of other invasive species databases.

After examining several potential databases such as WIMS, APCAM, and GEOWEED, it was determined that we could utilize the Natural Resource Database Template (NRDT) and incorporate many of the features developed by the Nature Conservancy in their Weed Information Management System (WIMS). The result is a database that gives us the opportunity to use mobile mapping technologies and Microsoft Access to collect data accurately and efficiently.

The Klamath Network (KLMN) data collection system is an integrated system of hardware and software that works to simplify the collection and management of invasive plant data. The central piece of system is the relational MS Access database ("the database") that works to keep track of all surveys, infestations, and random vegetation, and treatment data (Figure 1). This

database can be used in combination with ArcPad (the handheld version of ArcGIS) and a Windows-compatible GPS unit, like the Trimble GeoXT or Thales Mobile Mapper CE. If technical difficulties arise, data can also be collected on paper and manually entered into the database. Once a national database has been completed, we will reassess the database methods of this protocol to see if converting to the national database is necessary.

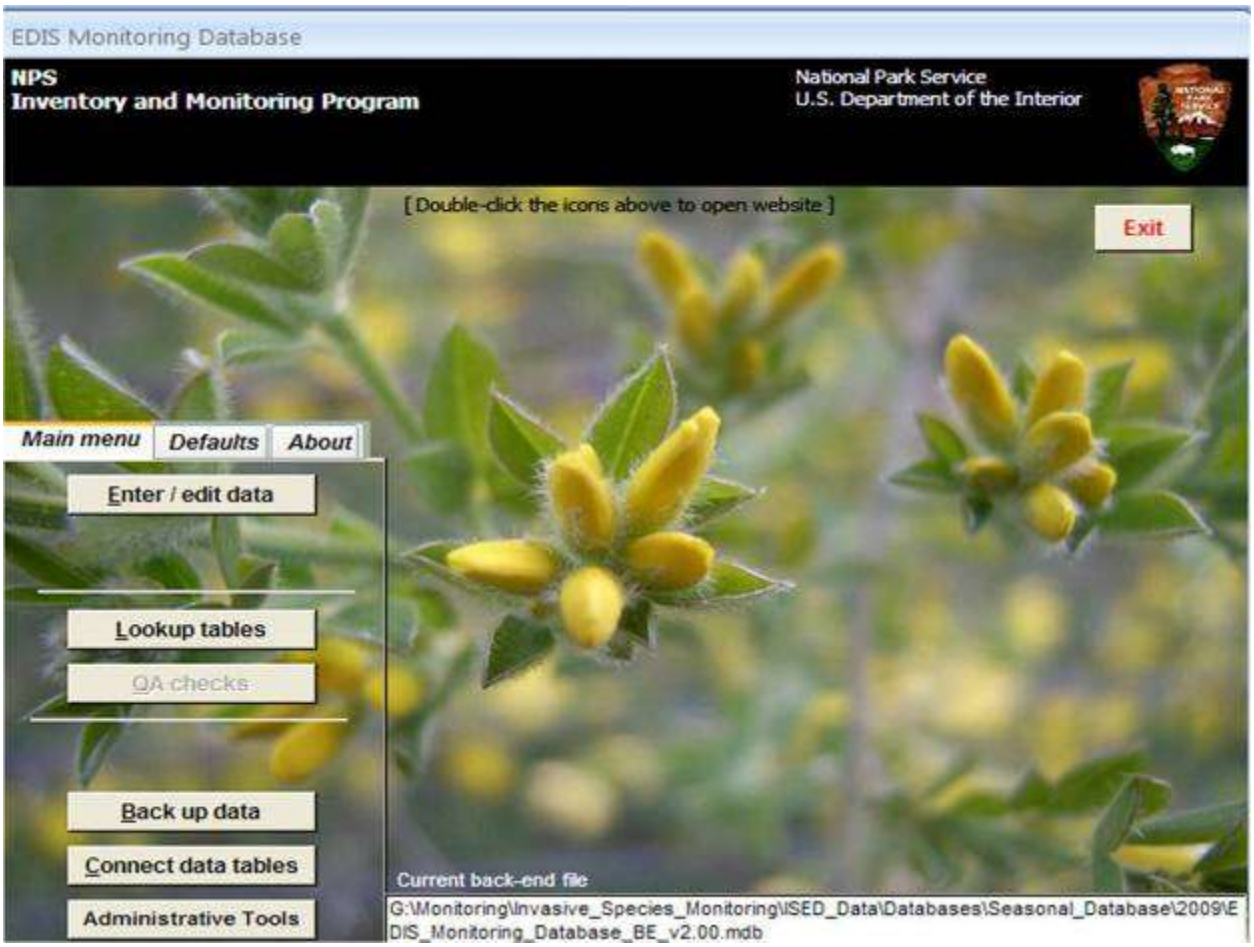

Figure 1. The main screen of the database that will be used to store information as part of this project. Clicking on the "Enter / Edit Data" button will bring up a list of all the areas in the database and the option to add new areas to the database.

Preparing the Database for Field Work

In order to prepare the database to be used in the field, the Crew Lead with help from the GIS specialist will need to provide the Data Manager with a GIS layer of all the sites that will be visited during the upcoming season, a list of field crew members and contact information, and a list of all species that will be recorded as part of this protocol (SOP #2: Field Work Preparation). Once the Data Manager has these lists, he/she can begin to prepare the project database that will be used by the field crews that year.

Entering New Sites

To prepare the project database so it can be used in the field, there are a variety of steps that need to be followed that are listed below.

1. The first thing the Data Manager must do is load a list of sites that will be surveyed that year into the database.
    a. It is the responsibility of the Project Manager to work with the GIS Specialist to develop this list of sites.
    b. The final list of sites to be surveyed should be located at: G:\Monitoring\Invasive_Species_Monitoring\ISED_GIS\PARK\YYYY and the name of the file is PARK_3kmSegs_YYYY.dbf. In both the file pathway and the file name, the "PARK" is the 4 letter park code and YYYY is the year of the survey.
    c. You need to make a copy of this file and place it in: G:\Monitoring\Invasive_Species_Monitoring\ISED_Data\Databases\Segments\YYYY\PARK.
2. Open the front-end of the database that you have placed in your working directory.
3. Click on the [Administrative Tools] button.
4. Click the [Upload Sites] button.
5. Browse to the location of the file you created in step 1c above.
6. Click the [Upload Sites] button.
7. The sites table should now be populated with the following:
    a. Site_ID
    b. Site_Name
    c. Site_Description (Road, Trail, Powerline, Campground)
    d. Unit_Code
    e. Starting X-Coordinate
    f. Starting Y-Coordinate
    g. Ending X-Coordinate
    h. Ending Y-Coordinate
    i. GIS ID Number
    j. GIS Shapefile Name
8. The project should now be ready to be used by the field crew.

Entering Contact Information

Next, the Data Manager will need to enter the contact information for each of the individuals that could be working on this project. To complete this task, follow the steps below.

1. Open the front-end of the database and click the [Lookup Tables] button.
2. Using the pick list, select tlu_contacts
3. Delete any of the contacts that are not going to be involved in the project this year.
4. Add any new contacts (such as new crew members) that will be involved in the project that year. Be sure to include the following information.
    a. Last Name
    b. First Name
    c. Middle Initial (if available)
    d. Organization
    e. Position Title
    f. Address
    g. Email
    h. Phone Number

Updating Pick List

Since this is a standardized protocol, the pick list values should not be changed with the exception of a few rare occasions. It is the responsibility of the Project Manager to follow all change procedure processes associated with this protocol prior to having the Data Manager change one of these values. Once proper procedures have been followed, the Data Manager should follow these steps to update a pick list.

1. First, determine which fields need to be updated.
2. Click on the [Lookup tables] button on the main form of the database.
3. Using the pick list, select tlu_Enumerations.
4. Find the Enum_Group associated with the list of data you want to edit.
5. Delete any values you no longer want to use.
6. Add any new values that are needed. Be sure to complete all fields, including:
    a. Enum_Group exactly as it is in the database
    b. Sort Order, which is the order you want the data to appear in the pick list.
    c. Enum_Code, the value that is stored in the database.
    d. Enum_Description, a description of the value that is stored in the database.
7. Once you are done, click the [Close] button in the upper, right corner of the form.
8. If will ask you if you want to save your changes, click [YES].
9. You are done.

Preparing the Trimble Handheld Pocket PC

Before moving the data files onto the Trimble units, make certain you have followed SOP #4: Setting up the Electronic Field Equipment. After you have the Trimble, properly plug the cradle of the Trimble unit into your desktop and place the unit into the cradle. Make sure ActiveSync starts up and is working properly. Follow the steps below to setup the file structure and add the files to the Trimble unit.

1. Using Microsoft Explore, go into Mobile Devise.
2. Create a new folder called “Invasives.” If this folder already exists, talk to the Project Manager to make sure it is OK to delete the old file.
3. Inside the invasives folder ,create the following folders:
    a. Applet - this is where applets for this project are stored.
    b. Backup_Files – this contains blank copies of all files.
    c. Data – this is the data files called PlotLocn and DataTime.
    d. Images – Background imagery is here is desired.
    e. Shapefiles – Non-data collection project shapefiles are located here such as segments, roads, trails, and sub-segment starting points.
4. Go to: G:\Monitoring\Invasive_Species_Monitoring\ISED_GIS\Template\ArcPad_Shapefiles and make a copy of all the files in this folder and place them in the “Data” folder on the Trimble unit.
5. Go to: G:\Monitoring\Invasive_Species_Monitoring\ISED_GIS\Template\ArcPad_Project and you should see two files called “Invasive xxxx.apm” and “Invasive xxxx.apm.bmp.” Make a copy of these files and place them directly into the invasives folder on the Trimble unit. Once on the Trimble unit, rename the files by replacing the xxxx with the field year (e.g. 2010).

6. Go to: G:\Monitoring\Invasive_Species_Monitoring\ISED_GIS\Template\ArcPad_Applets and make a copy of all the files in this folder and place them on the Trimble unit at program files/Arcpad/applet.
7. Create a .dbf file of the species that will be surveyed for during the field season. Make certain the file is name "Specieslist.dbf" and only contains two fields called "SCIENTIFIC" and "ITIS." An example can be found at: G:\Monitoring\Invasive_Species_Monitoring\ISED_Data\Databases\Species List\2009.
8. Make a copy of this dbase file and place it on the Trimble unit at: G:\Monitoring\Invasive_Species_Monitoring\ISED_GIS\Template\ArcPad_Shapefiles. You will be asked if you want to replace the current file; click [YES].
9. Go to: G:\Monitoring\Invasive_Species_Monitoring\ISED_Data\Databases\Segments\YYYY\PARK. The files of segments to be surveyed should be here and you should have already used this file to update the Access database.
10. Open the file using ArcMap and delete all the fields except the "3kSEG_NAME" field.
11. Make a copy of this dbase file and place it on the Trimble unit at: G:\Monitoring\Invasive_Species_Monitoring\ISED_GIS\Template\ArcPad_Shapefiles. You will be asked if you want to replace the current file; click [YES].
12. Let the GIS Specialist know the Trimble unit is ready for him/her to upload the background imagery and base shapefiles.
13. The GIS Specialist should consult with the Crew Leader to determine what imagery is needed. At the very least, DRG images for all the parks should be loaded.
14. At the very least, the GIS Specialist should load the following shapefiles:
    a. Roads, Trails, and Powerlines.
    b. Segments to be surveyed, where sub-segments are different colors (use dark color).
    c. Starting points for each sub-segment.
15. The Trimble units should now be ready for the field. It is the Crew Leaders responsibility to test the units before sending them out with field crews.

Collecting Data in the Field

Now that you have transferred the supporting tables, ArcPad forms and toolbars, and GIS data to the Trimble unit, you are ready to begin collecting data. SOP #6: Data Collection and Entry describes the processes to use the Trimble unit, hardcopy field forms, and project database to collect data.

After Collecting Data in the Field

Once you have collected the data using the Trimble unit, you will need to upload the data into the project database. Once the data have been uploaded into the project database, the data will need to be verified by the field crew. For step-by-step instructions for this process, see SOP #6: Data Collection and Entry. At the end of the field season, the crew members should submit their database, GIS files, images and associated metadata, and hardcopy datasheets to the Crew Lead. The Crew Lead is responsible for organizing the data and submitting them to the Data Manager following the timeline outlined in SOP #8: Data Transfer, Storage, and Archiving.

Uploading into the Master Database

After the data have been validated and verified by the field crew members and the Crew Lead (SOP #6: Data Collection and Entry), a Data Certification Form and Metadata Interview Form should be completed by the Crew Lead. Both forms and the finalized Project Database should be submitted to the Data Manager so he/she can incorporate the data into the Master Database.

Once the Data Manager has received the proper forms and the finalized database, he/she can upload the data to the master database. To complete this process, follow the steps below.

1. Make a copy of the back end of the database and place it in the backup folder that is located in the same location. The back end is located at: G:\Data_Management\Databases\Monitoring\Invasives.
2. Open the front end of the master database located at: G:\Monitoring\Invasive_Species_Monitoring\ISED_Data\Databases\Master_Database.
3. Click the "Administrative" tool button and then click the "Upload Project Database."
4. Browse to the location of the project database and click "Upload."
5. Close the database.
6. Send an email to all parties that the finalized database is ready so they can begin working on the annual report.